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Report of the technical review of the sixth national communication of Japan

Parties included in Annex I to the Convention are requested, in accordance with decision 9/CP.16, to submit a sixth national communication to the secretariat by 1 January 2014. In accordance with decision 7/CMP.8, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their sixth national communication supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

This report presents the results of the technical review of the sixth national communication and supplementary information under the Kyoto Protocol of Japan conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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Contents

		Paragraphs	*Page*
I.	Introduction and summary	1–10	3
	A. Introduction	1–5	3
	B. Summary	6–10	3
II.	Technical review of the reported information in the national communication and supplementary information under the Kyoto Protocol	11–149	6
	A. Information on greenhouse gas emissions and national circumstances relevant to greenhouse gas emissions and removals, including other elements related to the Kyoto Protocol	11–29	6
	B. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol	30–94	11
	C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol	95–114	19
	D. Provision of financial resources and technology transfer to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol	115–132	24
	E. Vulnerability assessment, climate change impacts and adaptation measures	133–139	28
	F. Research and systematic observation	140–146	29
	G. Education, training and public awareness	147–149	30
III.	Summary of reviewed supplementary information under the Kyoto Protocol	150–153	31
	A. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol	150–151	31
	B. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol	152–153	32
IV.	Conclusions and recommendations	154–166	32
V.	Questions of implementation	167	35
Annex			
	Documents and information used during the review		36

I. Introduction and summary

A. Introduction

1. For Japan, the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005. Under the Convention, Japan made a commitment to reducing its greenhouse gas (GHG) emissions by 3.8 per cent by 2020 below the 2005 level. Under the Kyoto Protocol, Japan committed itself to reducing its GHG emissions by 6 per cent compared with the base year[1] level during the first commitment period from 2008 to 2012. For the second commitment period, from 2013 to 2020, of the Kyoto Protocol, Japan did not inscribe a commitment to reduce its GHG emissions.

2. This report covers the in-country technical review of the sixth national communication (NC6) of Japan, coordinated by the secretariat, in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" (decision 23/CP.19) and the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1).

3. The review took place from 6 to 11 October 2014 in Tokyo, Japan, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Jameel Alsalam (United States of America), Ms. Diann Black-Layne (Antigua and Barbuda), Ms. Laura Elena Dawidowski (Argentina), Mr. Klaus Radunsky (Austria) and Mr. Robert George Sturgiss (Australia). Ms. Dawidowski and Mr. Radunsky were the lead reviewers. The review was coordinated by Ms. Sylvie Marchand and Mr. Nalin Srivastava (secretariat).

4. During the review, the expert review team (ERT) reviewed each section of the NC6. The ERT also reviewed the supplementary information provided by Japan as a part of the NC6 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Japan in its 2013 annual submission and previous submissions under Article 7, paragraph 1, of the Kyoto Protocol.

5. In accordance with decisions 23/CP.19 and 22/CMP.1, a draft version of this report was communicated to the Government of Japan, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Summary

6. The ERT conducted a technical review of the information reported in the NC6 of Japan in accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines on NCs). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol[2] is provided in the NC6 (see para. 150 below).

[1] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide, methane and nitrous oxide, and 1995 for perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

[2] Decision 15/CMP.1, annex, chapter II.

The supplementary information on the minimization of adverse impacts referred to in paragraph 4 above is complete and transparent.

7. Japan implemented most recommendations provided in the report of the in-depth review of the fifth national communication (NC5) of Japan.[3] The ERT commended Japan for its improved reporting. During the review, Japan provided further relevant information, including the executive summary to the NC6, supplementarity to domestic action of the use of units from the Kyoto Protocol mechanisms, and additional descriptions related to national legislative arrangements and administrative procedures that seek to ensure implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Japan also provided information on: targets and national circumstances (achievement status targets under the Kyoto Protocol; information related to the quantified economy-wide emission reduction target, Japan's new emission reduction target, impacts of the great east Japan earthquake and tsunami (GEJE) and the energy situation in Japan); GHG emissions (trends in GHG emissions and factor analysis); policies and measures (PaMs) (overall policy context, policy framework, cross-cutting PaMs and sectoral PaMs, information with respect to the impact of some PaMs on GHG emissions and a summary of the fourth strategic energy plan); and the methodology of GHG emission projections.

1. Completeness and transparency of reporting

8. Gaps and issues related to the reported information identified by the ERT are presented in table 1 below.

2. Timeliness

9. The NC6 was submitted on 27 December 2013, before the deadline of 1 January 2014 mandated by decision 9/CP.16, followed by revised versions submitted on 21 August 2014 and 22 September 2014. Japan also submitted an addendum to the NC6 on 9 October 2014.

3. Adherence to the reporting guidelines

10. The information reported by Japan in its NC6 is mostly in adherence to the UNFCCC reporting guidelines on NCs as per decision 4/CP.5 (see table 1).

[3] FCCC/IDR.5/JPN.

Table 1
Assessment of completeness and transparency issues of reported information in the sixth national communication of Japan[a]

Sections of national communication	*Completeness*	*Transparency*	*Reference to paragraphs*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to paragraphs*
Executive summary	Complete	Transparent		National systems	Mostly complete	Transparent	19
National circumstances	Mostly complete	Transparent	13	National registries	Complete	Transparent	
Greenhouse gas inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Transparent	
Policies and measures (PaMs)	Mostly complete	Transparent	32	PaMs in accordance with Article 2	Complete	Transparent	
Projections and total effect of PaMs	Partially complete	Transparent	100, 112	Domestic and regional programmes and/or arrangements and procedures	Complete	Transparent	
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent		Information under Article 10	Complete	Transparent	
Financial resources and transfer of technology	Mostly complete	Mostly transparent	116, 118, 129–131	Financial resources	Complete	Mostly transparent	116
Research and systematic observation	Complete	Transparent		Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	
Education, training and public awareness	Complete	Transparent					

[a] A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in the chapter on conclusions and recommendations.

II. Technical review of the reported information in the national communication and supplementary information under the Kyoto Protocol

A. Information on greenhouse gas emissions and national circumstances relevant to greenhouse gas emissions and removals, including other elements related to the Kyoto Protocol

1. Information on relevant national circumstances

11. In its NC6, Japan has provided a concise description of the national circumstances and elaborated on the framework legislation and key policy documents on climate change. Further information on the review of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B below. During the review, Japan provided additional information on the national circumstances related to the earthquake and tsunami, known as GEJE, which occurred in March 2011. The damage from this event included 15,889 people dead, 2,601 people missing, over 1 million buildings damaged or destroyed and economic damage of 17 trillion yen (JPY) (approximately USD 210 billion using the Organisation for Economic Co-operation and Development exchange rates for 2011). Japan also informed the ERT that as a consequence of GEJE, none of the 48 existing nuclear reactors in the country are currently under operation, but all of them are under inspection.

12. Japan complemented this information on the impacts of GEJE by an assessment of the impacts of GEJE on Japan's national GHG emissions, as well as of the consequences with respect to PaMs, projections and targets. The ERT is of the view that such information is helpful to better understand the current national circumstances of Japan.

13. During the review, Japan also informed the ERT about changes that took place in 2012 in the government structure, with the establishment of the Reconstruction Agency, with responsibility for planning, coordinating and implementing reconstruction measures related to GEJE. Japan also informed the ERT that the Nuclear and Industrial Safety Agency, which used to be part of the Ministry of Economy, Trade and Industry and in charge of regulating nuclear power generation before GEJE, has been relocated and is now part of the Ministry of the Environment. The ERT was also informed that its name has been changed to the Nuclear Regulation Authority. The ERT noted that this information was not reported in the NC6, and recommends that Japan improve the transparency of its reporting by including a more detailed description of the government structure in its next national communication (NC).

14. The ERT noted that during the period 1990–2012, Japan's population and gross domestic product (GDP) increased by 3.2 and 21.9 per cent, respectively, while GHG emissions per capita increased by 5.5 per cent and GHG emissions per GDP unit decreased by 10.7 per cent. It is interesting to note that from 2010 to 2012, after GEJE, the population decreased by 0.4 per cent, the total primary energy supply dropped significantly by 9.3 per cent, while GHG emissions increased by 7.0 per cent because all nuclear power station operations were halted and nuclear energy supply was substituted largely with fossil fuels. Table 2 illustrates the national circumstances of Japan by providing some indicators relevant to GHG emissions and removals.

Table 2
Indicators relevant to greenhouse gas emissions and removals for Japan

	1990	*2000*	*2010*	*2012*	*Change 1990–2012 (%)*	*Change 2011–2012 (%)*
Population (million)	123.61	126.83	128.04	127.55	3.2	–0.2
GDP (2005 USD billion using PPP)	3 276.52	3 665.17	3 954.75	3 993.81	21.9	1.4
TPES (Mtoe)	439.23	519.00	498.81	452.28	3.0	–2.1
GHG emissions without LULUCF (kt CO_2 eq)	1 234 372.55	1 340 565.03	1 256 116.17	1 343 136.79	8.8	2.8
GHG emissions with LULUCF (kt CO_2 eq)	1 167 554.65	1 254 916.60	1 183 758.79	1 268 071.43	8.6	3.0
GDP per capita (2005 USD thousand using PPP)	26.51	28.90	30.89	31.31	18.1	1.7
TPES per capita (toe)	3.55	4.09	3.90	3.55	–0.2	–1.9
GHG emissions per capita (t CO_2 eq)	9.99	10.57	9.81	10.53	5.5	3.0
GHG emissions per unit of GDP (kg CO_2 eq per 2005 USD using PPP)	0.38	0.37	0.32	0.34	–10.7	1.3

Sources: (1) GHG emission data: Japan's 2014 GHG inventory submission, version 2.1; (2) Population, GDP and TPES data: International Energy Agency.

Note: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

Abbreviations: GDP = gross domestic product, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, PPP = purchasing power parity, TPES = total primary energy supply.

2. Information on the greenhouse gas inventory, emissions and trends

15. Japan has provided a summary of information on GHG emission trends for the period 1990–2011. This information is fully consistent with the 2013 national GHG inventory submission. Summary tables, including trend tables for emissions in carbon dioxide equivalent (CO_2 eq) (given in the common reporting format tables), are provided within the trends in GHG emissions and removals chapter of the NC6. During the review, the ERT took note of the 2014 annual submission. The relevant information therein is reflected in this report.

16. Total GHG emissions[4] excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 8.8 per cent between 1990 and 2012, whereas total GHG emissions including net emissions or removals from LULUCF increased by 8.6 per cent over the same period. Over this period, CO_2 emissions increased by 11.8 per cent, methane (CH_4) emissions declined by 38.3 per cent, nitrous oxide (N_2O) emissions declined by 31.9 per cent and total fluorinated gas (F-gas) emissions declined by 12.1 per cent. From 1990 to 2007, CO_2 emissions had increased by 13.6 per cent owing to factors such as driving of larger cars, increased driving, and increasing residential and commercial energy use. From 2007 to 2009, CO_2 emissions declined, mainly owing to the impact of the

[4] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding land use, land-use change and forestry, unless otherwise specified.

global economic crisis. From 2009 to 2012, recovery from the economic crisis and the aftermath of GEJE combined to increase CO_2 emissions. The decrease in CH_4 emissions since 1990 has been mainly due to the decrease in emissions from the waste sector (likely to be a combination of control and organics diversion), and a decrease in emissions from the agriculture sector. The decrease in N_2O emissions has been mainly caused by decreasing emissions from adipic acid production (increased control) and decreased emissions from agriculture (decreases in livestock population and decreases in fertilizer application). For F-gases, there are opposing trends: emissions from industrial production are decreasing (e.g. chlorodifluoromethane (HCFC-22) production and semiconductor manufacturing), while the phase-out of chlorofluorocarbons and hydrochlorofluorocarbons is beginning to lead to greater emissions of hydrofluorocarbons (HFCs) from the use of ozone-depleting substance substitutes in refrigeration and air conditioning, which is a trend that continues in the projections. An analysis of the drivers of GHG emission trends in each sector is provided in chapter II.B below. Table 3 provides an overview of GHG emissions by sector from 1990 to 2012.

17. During the review, Japan provided additional analysis of past trends based on Kaya factor analysis[5] for each sector, on a year-by-year basis. This type of detailed analysis exceeds the usual presentation of GHG trends, and the ERT commends Japan for this detailed analysis and presentation.

Table 3

Greenhouse gas emissions by sector in Japan, 1990–2012

	GHG emissions (kt CO_2 eq)				*Change (%)*		*Share[a] by sector (%)*	
Sector	*1990*	*2000*	*2010*	*2012*	*1990–2012*	*2011–2012*	*1990*	*2012*
1. Energy	1 079 469.94	1 190 844.87	1 145 089.85	1 229 596.97	13.9	2.9	87.5	91.5
A1. Energy industries	325 205.20	359 316.71	407 329.21	512 406.28	57.6	9.2	26.3	38.1
A2. Manufacturing industries and construction	373 020.93	379 248.72	345 161.71	335 580.20	–10.0	–0.5	30.2	25.0
A3. Transport	215 569.37	264 004.85	228 165.50	219 755.28	1.9	–1.9	17.5	16.4
A4–A5. Other	162 119.03	187 172.77	164 002.98	161 439.60	–0.4	–1.6	13.1	12.0
B. Fugitive emissions	3 555.41	1 101.82	430.46	415.61	–88.3	–2.6	0.3	0.0
2. Industrial processes	99 539.86	94 344.74	65 832.56	69 515.75	–30.2	3.5	8.1	5.2
3. Solvent and other product use	287.07	340.99	98.95	90.68	–68.4	–6.7	0.0	0.0
4. Agriculture	29 134.72	25 952.00	24 209.74	23 904.76	–18.0	–0.5	2.4	1.8
5. LULUCF	–66 817.90	–85 648.44	–72 357.39	–75 065.36	12.3	–0.7	–5.4	–5.6
6. Waste	25 940.96	29 082.43	20 885.07	20 028.63	–22.8	–0.8	2.1	1.5
GHG total with LULUCF	**1 167 554.65**	**1 254 916.60**	**1 183 758.79**	**1 268 071.43**	**8.6**	**3.0**	**NA**	**NA**
GHG total without LULUCF	**1 234 372.55**	**1 340 565.03**	**1 256 116.17**	**1 343 136.79**	**8.8**	**2.8**	**100.0**	**100.0**

Source: Japan's 2014 GHG inventory submission, version 2.1 (for GHG emission data).

[5] Kaya factor analysis is a simplified approach to estimate the contribution of human activities (factors) to total GHG emission levels, which it expresses as the product of four inputs: population, GDP per capita, energy use per unit of GDP and CO_2 emissions per unit of energy consumed.

Note: The changes in emissions and the share by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable.

[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

3. National system

18. Japan provided in its NC6 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The description includes most of the elements mandated by decision 15/CMP.1. The ERT took note of the review of the changes to the national system as reflected in the report of the individual review of the GHG inventory of Japan submitted in 2013.

19. The ERT noted that the NC6 does not include all mandatory elements, such as the results of key source identification and a description of the process for the recalculation of previously submitted inventory data. The ERT also noted that this information was provided in the GHG inventory of Japan submitted in 2014, but that the NC6 does not include the corresponding cross reference. The ERT recommends that Japan improve the completeness of its reporting by including this information in the next NC submission.

4. National registry

20. In its NC6, Japan has provided information on the national registry in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT took note of the review of the changes to the national registry as reflected in the report of the individual review of the GHG inventory of Japan submitted in 2013.

5. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

21. Japan has reported in its NC6 useful information on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol.

22. According to the 1947 Constitution, the Japanese Administration is composed of legislative, executive and judiciary powers. The Parliament, or Legislature, is called the Diet and is composed of the House of Representatives (480 members) and the House of Councillors (242 members). The members of the Diet are elected by the Japanese people. The executive power is carried by the Cabinet, headed by the Prime Minister, supported by ministers who are appointed by the Prime Minister and who are usually members of the Diet. The Prime Minister is elected by the Diet. The highest judiciary power in Japan is the Supreme Court. Other courts are district courts, high courts, family courts and summary courts. Judges are appointed by the Cabinet.

23. The Prime Minister and individual ministers are in charge of developing climate change policy, and this is coordinated within the Cabinet by the Global Warming Prevention Headquarters. Individual ministries are in charge of overseeing particular PaMs, and expert councils for particular issues are tasked with developing and deliberating on the jurisdiction and stipulation of laws. A number of national institutions are involved in the implementation of this policy.

24. The three key environment laws in Japan are: the Act on the Promotion of Global Warming Countermeasures; the Law on the Promotion of Procurement of Eco-friendly Goods and Services by the State and Other Entities; and the Act on the Rational Use and Proper Management of Fluorocarbons. The Kyoto Protocol target achievement plan, as well as the national and local government action plans, guidelines for controlling emissions, the

GHG emissions accounting, reporting and disclosure system, the emissions trading Kyoto Protocol mechanisms and the previously mentioned Global Warming Prevention Headquarters, are provisions of the Act on Global Warming Countermeasures.

25. By March 2013, the Global Warming Prevention Headquarters[6] decided to replace the Kyoto Protocol target achievement plan by a plan for global warming prevention after a firm 2020 target has been set.[7] It also decided, in March 2013, on the principle of global warming policies for the time being. Key points of the principle are that Japan will proactively undertake global warming measures upon registration of a 2020 emission reduction target, and local authorities, private sectors and citizens are expected to take actions equivalent to or beyond those that were listed in the Kyoto Protocol target achievement plan, and that the Government will accelerate these measures by providing additional support.

26. To support actions needed for a 50 per cent reduction of global GHG emissions and an 80 per cent reduction in emissions from developed countries by 2050, Japan's Government is setting the Actions for Cool Earth (ACE) programme, building on innovation for low-carbon technologies, application of existing technologies and partnerships with various stakeholders. Another objective of this programme is overcoming the aftermath of GEJE and the accident at Fukushima nuclear power plant.

27. The Japan Center for Climate Change Action, established in 1999, has the objective of promoting activities that contribute to climate change mitigation through education and dissemination of both national and international information related to actions for addressing global warming and climate change. A central part of operations consists of the construction and maintenance of a searchable database (currently only in Japanese) of measures addressing global warming and climate change. During the review, Japan provided an opportunity for representatives of environmental and business non-governmental organizations (NGOs) to provide their views on domestic climate policy, including on legislative arrangements and enforcement and administrative procedures to the ERT.

28. As of October 2012, local public organization action plans had been drafted by all 47 prefectures and by 1,362 municipalities, and regional promotion plans had been drafted for 37 prefectures, as well as for 200 municipalities. The number of volunteers to promote activities to mitigate global warming has increased from 3,677 as of April 2005 to 6,914. Prefectural centres for the promotion of activities to stop global warming have been designated by all prefectures.

29. Japan provided in its NC6 a description of national legislative arrangements and administrative procedures which seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. Japan explained that measures for managing forest carbon sinks to enhance activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol promote forest conservation and sustainable forest management, which eventually contribute to the conservation of biodiversity and sustainable use of forest resources because they are linked to the objectives regarding the multiple roles of forests, as well as the supply and usage of forest products outlined in the basic plan for forest and forestry endorsed by the Cabinet in July 2011, in accordance with the Forest and Forestry Basic Act.

[6] The Global Warming Prevention Headquarters was established inside the Cabinet on December 19, 1997 with the aim of steadily implementing the Kyoto Protocol. It is chaired by the Prime Minister.

[7] This process is pending given the current uncertainty related to the contribution of nuclear power in the energy mix.

B. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

30. Japan has provided in its NC6 useful information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. During the review, Japan provided additional information on its PaMs, as described in paragraph 7 above.

1. Policies and measures related to implementation of commitments under the Convention

31. In its NC6, Japan reported on its PaMs adopted, implemented and planned in achieving its commitments under the Convention. Japan provided information on PaMs by sector and by gas and a description of the principal PaMs. The NC6 contains a similar set of PaMs to those in the NC5.

32. The ERT noted that Japan has provided only limited information on the mandatory requirement to provide information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention. The ERT therefore recommends that Japan improve the transparency of its reporting by including specific information on how it believes its PaMs, for example, by sector or by gas, are modifying longer-term trends in GHG emissions and removals.

33. The NC6 does not include some information requested by the UNFCCC reporting guidelines on NCs on quantified emission reductions for most energy PaMs, as well as related to the cross-cutting PaMs, including the J-credit scheme and the joint crediting mechanism (a new mechanism that is being advanced by the Japanese Government, referred to as JCM, see para. 42 below). During the review, Japan provided additional information with respect to the impacts of petroleum and coal taxes, as well as better descriptions of many PaMs, which has improved the transparency of the description of measures significantly, including better information for the industrial processes, agriculture, LULUCF and waste sectors. The ERT therefore encourages Japan to improve the completeness of its reporting by including quantified effects of key measures, including those related to key renewable energy and transport measures, in its next NC. In addition, the ERT notes that reporting would be greatly enhanced by the inclusion of the additional information on PaMs provided during the review in the next NC.

34. Some of the recommendations made in the previous review report were taken into consideration in order to improve reporting in the NC6, including information on the impact on the trend and status of implementation.

2. Policy framework and cross-sectoral measures

35. Japan's PaMs to limit GHG emissions mainly operate under the Basic Environmental Law and other legislation, under which is enacted the Act on Promoting Global Warming Countermeasures. In May 2013, this act was amended to replace the Kyoto Protocol target achievement plan, which had been formulated to address the first commitment period of the Kyoto Protocol, with provision for a forward-looking plan for global warming prevention (see para. 24 above). The full details of this plan are still to be determined. Until then, Japan is operating under the principle of global warming policies.

36. Japan announced, in November 2013, a new emission reduction target to reduce emissions to 3.8 per cent below the 2005 level. This is considered an interim target, and a firm target will eventually be set based on further review of Japan's energy policy and energy mix, followed by finalization of the plan for global warming prevention.

37. The energy sector accounted for 91.6 per cent of emissions in 2012. Measures to underpin action on emissions in the energy sector are comprehensive and include the following:

(a) Information systems have been developed through the accounting, reporting and disclosure programme;

(b) Cooperation of industry has been achieved through voluntary action plans (VAPs);

(c) Regulatory measures have been implemented through energy efficiency standards;

(d) Economic instruments have been utilized through:

(i) A feed-in tariff scheme for renewable energy sources;

(ii) A tax for climate change mitigation, which is an extra tax on fossil fuel consumption proportional to CO_2 emissions from (fossil fuel) combustion;

(iii) Tax expenditures to encourage demand for new passenger vehicles with high energy efficiency performance;

(iv) Development of a domestic carbon offset scheme called the J-credit scheme;

(v) Use of credits obtained under the JCM from offset projects in developing countries (see para. 42 below);

(e) Investment by the Government in infrastructure, research and demonstration projects to assist commercialization of new technologies is significant.

38. Japan implemented its accounting, reporting and disclosure programme in 2008, under which businesses must report emissions if their emissions exceed certain thresholds. These thresholds are 1,500 kilolitres of crude oil equivalent for energy consumption, or 3 kt CO_2 eq for non-CO_2 gases. Information is publicly disclosed, subject to certain restrictions.

39. VAPs in the industrial sector play by far the largest role in Japan's mitigation efforts across industry. These VAPs are drawn up on an industry association basis (e.g. the Chemical Industry Association and the Iron and Steel Federation), and include a target compared to a base year level. The target is to be met through a combination of domestic actions by the association and international units.

40. Industries with a VAP can choose to express the target in terms of CO_2 intensity, CO_2 emissions, energy intensity or energy consumption. In total, 90 industries have established VAPs for the period to 2020, including 34 industries participating in the Japanese business association (Keidanren). The VAPs cover around 50 per cent of Japan's total emissions and around 80 per cent of emissions from the industrial and energy conversion sectors. In the period to 2012, targets under VAPs were met by 84 of the 114 industries that formulated action plans.

41. The J-credit scheme is a cross-cutting measure that works as a carbon offset scheme. Eligible activities include renewables, energy efficiency enhancements and forest sequestration. Around 1,736 kt CO_2 eq of emission reductions is expected to be achieved from projects currently registered. The principal benefit for companies of participation is to be able to report these offsets in their annual report under the accounting, reporting and disclosure programme or as contributions towards VAP commitments.

42. JCM is designed to facilitate the diffusion of leading low-carbon technologies, products, systems, services and infrastructure in developing countries. Upon signature of a bilateral agreement between Japan (or another developed country) and a developing country, JCM enables businesses to invest in offset projects in developing countries for

which credits are granted for avoided GHG emissions and GHG emission reductions. The rules for such credits are agreed by a joint committee that consists of representatives from both Governments which are part of the bilateral agreement. REDD-plus[8] projects for the sustainable management of forests in developing countries are being considered for implementation under the JCM. The use of credits from the JCM for Japan's domestic regulatory purposes is under consideration.

43. Japan provided information on PaMs at the national, subnational and regional levels. Many PaMs are also implemented at the local level, for example, through 1,789 local government action plans. Table 4 provides a summary of the reported information on the PaMs of Japan.

Table 4
Summary of information on policies and measures reported by Japan

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Act on the Promotion of Global Warming Countermeasures	NE
	Accounting, reporting and disclosure programme	NE
	Voluntary action plans	NE
	Tax for climate change mitigation	5 685–23 504
	J-credit scheme	NE
	Joint crediting mechanism	NE
	Green finance	NE
Energy		
Energy supply	Best available technology standards	NE
	Offsets for coal-fired power stations	NE
	Infrastructure investment	NE
	Demonstration projects for coal gasification, carbon capture and storage, tidal and deep sea wind farms	NE
Renewable energy	Feed-in tariff scheme	NE
Energy efficiency	Energy Conservation Act 1979	NE
	Voluntary action plans	NE
	Top Runner programme	NE
Residential and commercial sectors	Building efficiency standards	NE
	Local government action plans	NE
Transport	Top Runner programme	NE
	Automobile acquisition tax expenditures	NE
	Voluntary action plans	NE
Industrial sectors	Voluntary action plans	NE

[8] In decision 1/CP.16, paragraph 70, the Conference of the Parties encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks.

Sectors affected	*List of key policies and measures*	*Estimate of mitigation impact (kt CO_2 eq)*
	Fluorocarbon Recovery and Destruction Act 2013	9 700
Agriculture	Reducing fertilizer use	503
	Improving energy efficiency of agricultural equipment	599
	Sustainable agricultural production practices	NE
Forestry	Forest management	38 000
	Revegetation	1000
Waste management	Waste Management Act	600

Note: The greenhouse gas reduction estimates given for some measures are reductions in carbon dioxide or carbon dioxide equivalent for 2020.

Abbreviation: NE = not estimated.

3. Policies and measures in the energy sector

44. The energy sector accounted for 91.6 per cent of Japan's total emissions in 2012. Between 1990 and 2012, GHG emissions from the energy sector increased by 13.9 per cent (151,000 kt CO_2 eq), mainly driven by the almost complete loss of nuclear generation capacity from 2011.

45. ***Energy supply***. In March 2011, Japan experienced GEJE, which led to a nuclear accident at the Fukushima nuclear power plant. All 48 nuclear reactors in Japan have now been shut down subsequent to this accident. Nonetheless, over time, overall electricity generation has been largely unaffected because of increases in the utilization of existing oil- and gas-fired plants. The availability of this oil- and gas-fired capacity, previously held in reserve to meet peak load demand, has provided Japan with the flexibility to rapidly switch out of nuclear power generation with less disruption than would otherwise have been the case.

46. On the other hand, Japan's ability to switch back to nuclear power is currently more constrained because of nuclear safety issues. The nuclear power plants will only be able to recommence generation when the plants have met stringent new nuclear safety regulations. As at September 2014, the operators of 20 nuclear plants had applied to the Nuclear Regulatory Authority for approval to recommence operations. The outcomes of these applications remain unclear. The time required for the consideration of these applications, and the need for consultations with all stakeholders, has generated considerable uncertainty about the extent of future generation levels from the nuclear power industry.

47. During the review, the Government of Japan indicated to the ERT that the future energy mix of the energy supply system would be considered through a forthcoming review of Japan's energy policy. The Government indicated that energy policy in Japan must meet multiple objectives including energy supply stability, energy security, cost, maintenance of industry capability, as well as emission mitigation objectives. The Government will need to balance these objectives when considering the outcomes of the energy policy review.

48. Prior to the completion of the energy policy review, the Government of Japan had already undertaken several enhancements of existing measures to mitigate GHG emissions, and introduced new measures, in part in response to the closure of the nuclear power plants.

49. One important measure implemented in 2012 to reduce CO_2 emissions from energy sources is the tax for climate change mitigation. This new tax adds fixed tax rates on the current petroleum and coal taxes paid on consumption according to the amount of CO_2

emissions by each fossil fuel, resulting in an increase of about JPY 289/t CO_2 (approximately USD 3 using the Organisation for Economic Co-operation and Development exchange rates for 2013). The tax rate is being raised progressively over three and a half years in order to avoid a sudden increase in the tax burden with the last increase programmed for 1 April 2016. During the review, an estimate of the impact of this measure was provided by the Ministry of the Environment (5,685–23,504 kt CO_2 eq annually, in 2020). This abatement is estimated to be mostly achieved through the recycling of revenue raised by various government abatement programmes, with a small contribution from direct price effects.

50. Currently, Japan's electricity utilities are vertically integrated regional monopolies. In 2015, the Government will consider a plan for the legal unbundling of the utilities by 2020 in the third phase of an electricity market reform process designed to encourage greater competition and to reduce costs of production. This development is significant in that it will also likely enhance the effectiveness of price incentives achieved, for example, through existing taxation measures.

51. The Government has tightened the regulation of the power sector. In order to comply with environmental impact assessment plans, new coal-fired plants must offset the additional GHG emissions over a gas-fired plant through the implementation of sector-wide frameworks or, prior to the finalization of these frameworks, through the voluntary use of the J-credit scheme or purchase of international credits under the JCM. New coal-fired plants must also meet best available technology (BAT) standards established by the Government.

52. The Government is investing in infrastructure, including in the electricity grid to improve network transmission. One benefit will be to improve the prospects of wind power, which has the most potential in the northern island of Hokkaido, through better grid connections to major electricity consumers to the south.

53. The Government is also investing in demonstration projects in order to facilitate the commercialization of a range of new energy technologies. These demonstration projects include coal gasification technology, carbon capture and storage, a deep sea floating wind farm and a tidal power plant.

54. ***Renewable energy sources***. Renewable energy sources accounted for 10.9 per cent of Japan's electricity generation in 2013. The primary sources of renewable energy are major hydropower systems. Other sources (solar, wind, biomass waste materials, geothermal, etc.) accounted for 2.2 per cent of Japan's electricity generation in 2013. As Japan has no additional potential to develop large-scale hydropower, future expansions of supplies from renewable sources must come from these, currently minor, energy sources.

55. Japan has implemented a comprehensive set of measures to promote renewable sources of energy. The measures are described in the NC6, and more detail was provided to the ERT during the review.

56. Japan introduced a feed-in tariff scheme on 1 July 2012, under which utilities are obliged to purchase renewable energy, if offered, at rates fixed by the Government for individual technologies. The feed-in tariff rates are relatively significant; as an example, the rate for small-scale solar power was JPY 37/kWh in 2012 (USD 0.46 using the Organisation for Economic Co-operation and Development exchange rates for 2012). These tariff rates have apparently encouraged a relatively large response in supply, with the share of renewable energy sources (outside large-scale hydropower) increasing by 32 per cent in 2013, albeit from a small base.

57. ***Energy efficiency***. To achieve its target of reducing GHG emissions by 3.8 per cent below the 2005 level in 2020, Japan needs to reduce its national energy intensity by 20 per

cent between 2005 and 2020, which amounts to a 44 million kilolitres crude oil equivalent reduction. The Japanese economy is already at a relatively low level of energy intensity on a global scale and further reduction may not be easy.

58. Energy consumption is governed overall by the Energy Conservation Act 1979. Businesses must report energy consumption levels under the accounting, reporting and disclosure programme (see para. 37 above). Energy efficiency measures are promoted through the implementation of VAPs by industry and energy efficiency standards for a range of energy appliances developed under the top runner programme, which requires manufacturers and importers of equipment and devices[9] to meet energy efficiency standards in line with BAT standards that are among the most demanding worldwide.

59. ***Residential and commercial sectors***. The residential and commercial sectors are an important source of expected reductions in energy consumption across the economy. Residential energy consumption is projected to reduce by 17.9 per cent from the 2005 level by 2020, while commercial energy consumption is projected to reduce by 7 per cent by 2020 from the 2005 level.

60. The regulations highlighted above, namely the Energy Conservation Act and its top runner standards, play a key role in addressing energy efficiency in the residential and commercial sectors.

61. Other measures include economic and fiscal incentives, such as the availability of low-interest loans to buy energy-efficient houses, and subsidies to promote energy efficiency in small- and medium-sized enterprises. Energy labelling is also used. Actions in this area by municipalities, such as through low-carbon society plans, are also increasingly important. In the longer term, the promotion of energy efficiency in buildings is also expected to be implemented.

62. ***Transport sector***. The transport sector is the major source of projected reductions in energy consumption across the economy. Consumption is projected to reduce by 26 per cent from the 2005 level by 2020.

63. Japan has implemented a comprehensive set of measures in the transport sector. The measures are described in the NC6, and more detail was provided to the ERT during the review.

64. The automotive industry is governed by a VAP, as well as the Top Runner programme, which is a mandatory programme for companies to fulfil minimum standard efficiency targets within specified time frames. Fuel efficiency standards are decided by a joint committee led by the Ministry of Land, Infrastructure and Transport and the Ministry of Economy, Trade and Industry, and are updated as necessary. The corporate average fuel efficiency standard for new sales of gasoline passenger vehicles is projected for 2020 to be 20.3 km/litre. This is an increase of 24.5 per cent from the 2009 efficiency standard level, when the standard was 16.3 km/litre.

65. Demand for next-generation vehicles (hybrid, electric, plug-in hybrid, fuel cell, clean-diesel and compressed natural gas) is fostered through a range of fiscal measures. Preferential tax treatment is provided to these vehicles if their fuel efficiency and exhaust gas performance exceed the specified standards under the automobile acquisition tax, the automobile weight tax and the automobile tax. Partly as a consequence of these measures, the share of next-generation vehicles in total passenger vehicle sales has risen from 11 per cent in 2009 to 23 per cent in 2013.

[9] Alternating current motors, electric water heaters, light-emitting diode light bulbs, and multifunction machinery and printers were added in 2013.

66. During the review, the ERT was also provided with information on longer-term transport-related goals. These include raising the share of next-generation vehicle sales to 50 per cent by 2030.

67. Other PaMs are designed to influence longer-term trends in energy consumption. These measures include government investment in infrastructure and infrastructure design to improve the logistics of freight movements and measures designed to improve driver/operator behaviour.

68. ***Industrial sector***. In the industrial sector, consumption is projected to reduce by 1 per cent from the 2005 level by 2020.

69. Japan principally implements VAPs with industries in the industrial sector (see paras. 39 and 40 above).

4. Policies and measures in other sectors

70. Between 1990 and 2012, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 26.7 per cent (41,362.79 kt CO_2 eq), mainly owing to the decrease in CH_4 emissions from the waste sector (likely to be a combination of control and organics diversion), and a reduction in CH_4 emissions from the agriculture sector. A decrease in N_2O emissions has been mainly caused by decreasing emissions from adipic acid production (increased control) and decreased emissions from agriculture (decreases in livestock population and decreases in fertilizer application). Emissions from industrial production decreased, namely for HCFC-22 production and semiconductor manufacturing.

71. ***Industrial processes***. Between 1990 and 2012, GHG emissions from the industrial processes sector decreased by 30.2 per cent from 99,539.86 to 69,515.75 kt CO_2 eq, mainly driven by the reduction in emissions of F-gases and by the reduction in N_2O emissions from adipic acid production.

72. In future, emissions from industrial processes are expected to increase, driven by strong growth in emissions of HFCs. Without additional measures, the stock of HFCs contained in equipment in use in Japan is projected to reach 400,000 kt CO_2 eq by 2020, while emissions of HFCs are projected to grow from 18,300 to 41,000 kt CO_2 eq by 2020.

73. Japan has implemented a comprehensive set of measures in the industrial processes sector, including through VAPs, under which industries project, monitor and report on emission outcomes. The measures are described in the NC6, and more detail was provided to the ERT during the review.

74. Newly introduced measures, contained in the Fluorocarbon Recovery and Destruction Law, are designed to encourage the more rational use and management of HFCs at all stages of the HFC life cycle. These measures include encouragement of the use of alternative gases to HFCs and improved gas recovery at the point of equipment disposal. They are designed to abate at least 9,700 kt CO_2 eq a year by 2020. In 2012, 3,255 kt CO_2 eq of HFCs was recovered and destroyed.

75. In addition to these measures, the Government of Japan has supported research into technologies to replace HFCs in the refrigeration and air-conditioning sector with CO_2 and has installed devices to destroy synthetic gases.

76. The ERT commends Japan for the provision of estimates of the effects of key measures in the industrial processes sector in its NC6.

77. ***Agriculture***. Between 1990 and 2012, GHG emissions from the agriculture sector decreased by 18.0 per cent (5,229.97 kt CO_2 eq), mainly driven by the reduction in crop acreage and in the amount of fertilizer applied to cropland.

78. The measures are described in the NC6, and more detail was provided to the ERT during the review.

79. Japan did not provide estimates of the effects of key measures in the agriculture sector in the NC6, although estimates were provided during the review. The ERT encourages Japan to report these quantified effects of measures in the agriculture sector in its next NC (see para. 33 above).

80. ***LULUCF***. The LULUCF sector was a net removal of 75,500 kt CO_2 eq in Japan in 2012 and net GHG removals increased by 8,300 kt CO_2 eq since 1990. Forests are managed to provide for multiple functions, including for timber, conservation and biodiversity values.

81. Japan has implemented a comprehensive set of measures in the LULUCF sector. The measures are described in the NC6, and more detail was provided to the ERT during the review.

82. The ERT noted that Japan has introduced a number of additional measures and new legislation under the basic plan for forest and forestry to enhance removals from forest management, which promoted thinning of 3.3 million hectares over six years, and the 2010 Act for the Promotion of Wood Use in Public Buildings, which aimed to stimulate the use of wood. A revised law, the Thinning Promotion Special Act (2013), will support action for the 2013–2020 period.

83. Revegetation activities are aimed at the conservation, expansion and management of urban parks and green areas and contributed 1,161.85 kt CO_2 eq in 2012.

84. Japan has introduced into the Act for Promoting the Introduction of Sustainable Agricultural Production Practices measures to enhance carbon sequestration in agricultural and pastoral lands. No estimate of projected abatement was reported in the NC6 for this measure.

85. Japan elected forest management and revegetation activities under Article 3, paragraph 4, of the Kyoto Protocol. Japan estimated the sequestration from forest management activities to be an average of 47,666.67 kt CO_2 eq sequestrations over the period 2008–2012, equivalent to the cap for forest management, and to have contributed 3.8 per cent towards meeting the Kyoto Protocol target for the first commitment period. Forest management is projected to deliver 38,000 kt CO_2 eq sequestrations in 2020, which is equivalent to the cap on forest management sequestration for the second commitment period of the Kyoto Protocol.

86. The ERT commends Japan for the provision of estimates of the effects of key measures in the LULUCF sector in its NC6.

87. ***Waste management***. Between 1990 and 2012, GHG emissions from the waste sector decreased by 22.8 per cent from 25,940.96 to 20,028.63 kt CO_2 eq.

88. Japan has implemented a comprehensive set of measures in the waste sector. The measures are described in the NC6, and more detail was provided to the ERT during the review.

89. The principal policies are governed by the sound material cycle plan put in place under the relevant act, aimed at the minimization, separation, reuse and recycling of waste, improving the efficiency of waste incineration and the recovery of waste energy.

90. The implementation of this policy will divert waste away from disposal at landfills in order to achieve a saving of 400 kt CO_2 eq in 2020. Measures have also been taken to divert material away from waste incineration towards recycling in order to achieve abatement of 200 kt CO_2 eq in 2020.

91. The ERT commends Japan for the provision of estimates of the effects of key measures in the waste sector in its NC6.

5. Policies and measures related to implementation of commitments under the Kyoto Protocol

92. Japan reported on its package of PaMs adopted, implemented and elaborated in achieving its commitment under the Kyoto Protocol.

93. The NC6 includes information on how Japan promotes and implements the International Civil Aviation Organization/International Maritime Organization decisions to limit emissions from aviation and marine bunker fuels.

94. In its NC6, Japan reported information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on international trade and social, environmental and economic impacts, on other Parties, especially developing country Parties. Further information on how Japan strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in the 2013 annual submission, is presented in chapter III.B below.

C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

95. The NC6 and first biennial report (BR1) of Japan include a 'with measures' projection for 2020. Optional scenarios 'without measures' and 'with additional measures' were not included. Updated projections were not available during the review.

1. Projections overview, methodology and key assumptions

96. The GHG emission projections provided by Japan in the NC6 include a 'with measures' scenario until 2020, presented relative to actual inventory data for 1990–2011 at five year intervals. Projections are presented on a sectoral basis for energy-related CO_2 emissions only. This approach was used in both the projections and the PaMs chapters in the NC6. Projections of total GHG emissions were provided on a gas-by-gas basis for all the following GHGs: CO_2, CH_4, N_2O, perfluorocarbons (PFCs), HFCs and sulphur hexafluoride (SF_6) (treating PFCs and HFCs collectively in each case). Projections are also provided as a national total, using global potential warming (GWP) values.

97. However, the ERT noted that the NC6 did not include some of the elements required by the UNFCCC reporting guidelines on NCs. The NC6 did not include projections for:

(a) GHG emissions in an aggregated format for each sector using GWP values (non-CO_2 emissions in the energy sector and GHG emissions for other sectors were missing);

(b) Net emissions of CO_2, CH_4, and N_2O including LULUCF;

(c) Emissions related to fuel sold to ships and aircraft engaged in international transport.

98. In addition, the NC6 did not present relevant information on factors and activities for each sector to provide an understanding of emission trends in the years 1990 to 2020.

99. During the review, Japan provided additional information comparing the current target to previous targets. A full discussion of this information is included in section II.C of the technical review report of the BR1 regarding the quantified economy-wide emission reduction target.

100. The ERT recommends that Japan include these missing elements listed in paragraphs 97 and 98 above in its next NC.

101. The ERT noted that some of the non-mandatory elements of the UNFCCC reporting guidelines on NCs were also missing. The ERT encourages Japan to include the following in its next NC:

(a) Information on the sensitivity to key underlying assumptions, where possible from a quantitative perspective (e.g. it would be very useful to understand the sensitivity of the projections to possible decisions regarding nuclear energy);

(b) Main differences in key assumptions and methods between NC6 and NC5. Information comparing key assumptions from the current target to the previous target was presented during the review (reviewed in section II.B. of the technical review report of the BR1). This type of information is very useful for understanding how projections have changed between NCs;

(c) A 'with additional measures' scenario in addition to the standard 'with measures' scenario, and to use these scenarios to clearly differentiate the emission trend implied by currently implemented and adopted measures in contrast to those measures that have been planned, but not yet implemented.

102. The projections scenario 'with measures' is based on current emission reduction targets and implemented policies. The future energy mix is unknown, so the projection is based on the energy mix in 2012. A footnote in the NC6 clarified that a relatively recent policy on F-gas management has not yet been incorporated into the projections, and policies that influence the energy mix have implicitly not been included (e.g. renewable energy deployment).

103. Japan did not explicitly report on changes to projections methodology; however, based on the methodology descriptions in the NC6 and the NC5, the methodology has changed significantly. The NC5 methodology used some complex econometric models. The NC6 projections have been estimated based on indicative activity factor estimates (including population, households, GDP and energy use) and emission factor estimates. For energy-related CO_2 emissions, the emission factor is based on the 2012 energy mix (because the future energy mix is not available). For other sectors, Japan provided a general description that the choice of emission factor is based on the strength of policies in the sector, but details of individual source or sector methodologies (for non-energy sectors) were not provided.

104. Japan provided values for key assumptions including population, households and GDP. Related to the energy sector, there is some discussion of activities such as changes in final energy use. However, there is not enough information to fully understand the factors and drivers behind the trends. Sensitivity scenarios were not presented; however, projections are very sensitive to future decisions regarding the energy mix.

2. Results of projections

105. Japan's Kyoto Protocol target for the first commitment period is to reduce its emissions by 6 per cent below its base year level or to an average annual emission level of 1,185,651.53 kt CO_2 eq over the period 2008–2012. For this period, Japan reported a five year average annual emission level of 1,278,482.34 kt CO_2 eq without LULUCF, or 1.4 per cent above the base year level. Japan expects to meet its Kyoto Protocol first commitment

period target through a combination of assigned amount units, units from activities within LULUCF, and units from Kyoto Protocol mechanisms. Reported contributions of units from LULUCF activities were −3.9 per cent of the base year level, and units from mechanisms of the Kyoto Protocol were −5.9 per cent of the base year level. Japan is not participating in the second commitment period of the Kyoto Protocol.

106. Total GHG emissions excluding LULUCF in the 'with measures' scenario are projected in 2020 to be at a level that is 0.9 per cent above the 2005 base year level of 1,351,406.69 kt CO_2 eq for Japan's 2020 target under the Convention. Considering the reported information on the expected level of contribution from forest management of LULUCF removals in 2020 of 38,000 kt CO_2 eq, projected GHG emissions including these removals are expected to be 1.9 per cent below the 2005 base year level by 2020, while the target is 3.8 per cent below the 2005 base year level. Japan plans to make up this difference with additional policies not yet included in the projections (e.g. renewable energy and refrigerant management policies) and units from market-based mechanisms. The projected level of GHG emissions excluding LULUCF in 2020 is expected to be 10.5 per cent above the 1990 level.

107. Energy-related CO_2 emissions (which make up more than 90 per cent of emissions) are projected to increase by 0.4 per cent between 2005 and 2020, resulting from increases in emission intensity of energy (CO_2 emissions per unit of energy) due to the substitution of nuclear energy production by fossil fuel energy production that are not compensated by sufficient decreases in energy use. Non-energy-related CO_2, CH_4 and N_2O emissions are expected to decline by 12.5 per cent, 21.7 per cent and 8.3 per cent, respectively, over this period. Drivers for trends in emissions of these gases were not discussed. F-gas emissions are expected to increase by 109.1 per cent. The projected increase in F-gas emissions is based on increasing use of HFCs as substitutes for ozone-depleting substances, such as in air conditioning and refrigeration. However, expected reductions resulting from the recent enactment of the Act on Rational Use and Proper Management of Fluorocarbons have not yet been incorporated into the projections.

108. Emission projections for energy-related CO_2 emissions were presented by sector for the following sectors: industrial, commercial, residential and transport. For these sectors, expected changes in energy use were provided. The sharpest decrease is expected in energy used for transportation, a 25.8 per cent decrease between 2005 and 2020, followed by a 17.9 per cent decrease in energy use in the residential sector. Declines in energy use for the industrial and commercial sectors are projected to be more modest, at 1.1 per cent and 6.5 per cent, respectively. The projections chapter of the NC6 does not include a discussion of factors or drivers for the trends in these sectors. Regarding CO_2 removals from forest carbon sinks, Japan expects that its usage of LULUCF for the purpose of its target will be the agreed upper limit of the second commitment period of the Kyoto Protocol of 3.5 per cent of the 1990 level[10] (the level of removals in 2020 will correspond to 2.8 per cent of the 2005 level). The NC6 describes the projected area, stock and timber supply of forest declared in the basic plan for forest and forestry, but does not provide projections of net emissions including LULUCF.

109. Japan has described a plausible pathway for how it plans to meet its 2020 target. The pathway consists of the following:

(a) Total emissions without LULUCF are projected to be 0.9 per cent above the 2005 base year level;

[10] Japan does not participate in the second commitment period of the Kyoto Protocol, but has adopted this limit for its use of removals and sinks from LULUCF in achieving its 2020 target.

(b) The contribution from forest management in LULUCF is projected to represent 2.8 per cent of the 2005 base year level;

(c) Additional reductions due to a combination of policies not included in the current projections (e.g. a new refrigerant management law and promotion of renewable energy that were not explicitly modelled) and use of credits from JCM (see para. 42) or potentially units from market-based mechanisms under the Convention;

(d) The total of these three elements results in an emission level of 3.8 per cent below the 2005 base year level, which meets the quantified economy-wide emission reduction target.

110. The projected emission levels under the 'with measures' scenario and information on the Kyoto Protocol targets and quantified economy-wide emission reduction target are presented in table 5 and the figure.

Table 5

Summary of greenhouse gas emission projections for Japan

	Greenhouse gas emissions (kt CO_2 eq per year)	*Changes in relation to the base year[a] level (%)*	*Changes in relation to the 1990 level (%)*
Kyoto Protocol base year[b]	1 261 331.42	0.0	2.1
Kyoto Protocol target for the first commitment period (2008–2012)	1 185 651.53	–6.0	–3.9
Kyoto Protocol target for the second commitment period (2013–2020)	NA	NA	NA
Quantified economy-wide emission reduction target under the Convention	1 300 053.24	–3.8[c]	5.3
Inventory data 1990[d]	1 234 372.55	–2.1[e]	0.0
Inventory data 2012[d]	1 343 136.79	6.5[e]	8.8
Average annual emissions for 2008–2012[d]	1 278 482.34	1.4[e]	3.6
'Without measures' projections for 2020[f]	NE	NE	NE
'With measures' projections for 2020[f]	1 364 000	0.9[g]	10.5
'With additional measures' projections for 2020[f]	NE	NE	NE

Abbreviation: NA = not applicable, NE = not estimated.

[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The Kyoto Protocol base year level of emissions is provided in the initial review report contained in document FCCC/IRR/2007/JPN.

[c] The base year for Japan's quantified economy-wide emission reduction target under the Convention is 2005. The base year emission level for 2005 is 1,351,406.69 kt CO_2 eq.

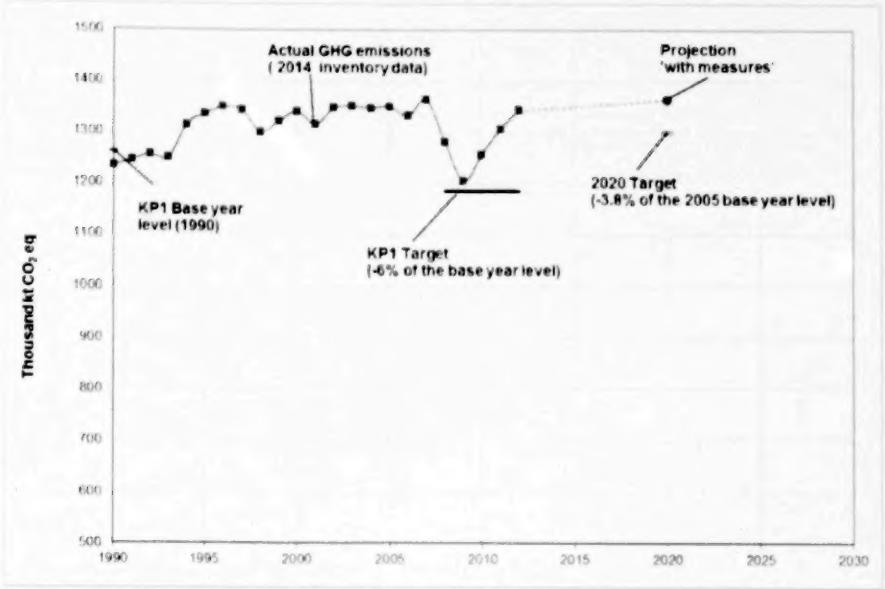
[d] Japan's 2014 greenhouse gas inventory submission version 2.1; the emissions are without land use, land-use change and forestry.

[e] Change relative to the Kyoto Protocol base year.

[f] Japan's sixth national communication and/or first biennial report. The figures provided did not include decimals.

[g] Change relative to the 2005 Convention base year for the 2020 target.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2012: Japan's 2014 greenhouse gas inventory submission version 2.1; the emissions are without land use, land-use change and forestry; (2) Data for the year 2020: Japans' sixth national communication and/or first biennial report, the emissions are without land use, land-use change and forestry. Dashed line from 2012–2020 is an interpolation by the ERT from inventory data for 2012 and projection data for 2020 from Japans' sixth national communication and/or first biennial report.

Abbreviations: GHG = greenhouse gas, KP1 = first commitment period of the Kyoto Protocol.

3. Total effect of policies and measures

111. In the NC6, Japan did not report the estimated and expected total effect of implemented and adopted PaMs.

112. The ERT recommends that Japan include an estimate of the total effect of PaMs, in total and by gas, in the next NC.

4. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

113. Japan in its NC6 explained that by the end of 2013, it acquired units from the Kyoto Protocol mechanisms equivalent to 98,000 kt CO_2 eq. In addition, Japan reported that in accordance with the environmental action plan of the Japanese Electric Utility Industry, the Federation of Electric Power Companies of Japan acquired and transferred to the Government of Japan 273,000 kt CO_2 eq of units for retirement. The total units acquired by Japan amounted to 371,000 kt CO_2 eq, which represents 74,200 kt CO_2 eq on an average annual basis, or 5.9 per cent of the base year emission level.

114. In 2007, the last year before the start of the first commitment period of the Kyoto Protocol, Japan's total GHG emissions amounted to 1,364,282.27 kt CO_2 eq, which represents an increase of 8.2 per cent above the base year level. In the NC6, Japan reported that its 2008–2012 average annual emission level after accounting for LULUCF and units from Kyoto Protocol mechanisms would be at 16.6 per cent below its 2007emissions level.

Given that the use of units from the Kyoto Protocol mechanisms can contribute for a 5.9 per cent decrease from the base year level, which is about a third of the total 16.6 per cent decrease from the 2007 emission level, Japan considers that its use of units from the Kyoto Mechanisms is supplemental to its domestic action.

D. Provision of financial resources and technology transfer to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

1. Financial resources, including "new and additional" resources and resources under Article 11 of the Kyoto Protocol

115. In its NC6, Japan provided mostly complete and mostly transparent information on provision of support required under the Convention and its Kyoto Protocol. In its NC6, Japan provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention as required by the UNFCCC reporting guidelines on NCs and under Article 11 of the Kyoto Protocol, as required by the "Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol". The ERT considers that overall, the NC6 was a significant improvement over the NC5, and it clearly showed the large support of Japan to developing countries, including particularly vulnerable countries.

116. The ERT found that information on "new and additional" financial resources was not provided in the textual part of the NC6 following the outline of the UNFCCC reporting guidelines on NCs, nor was table 3 of the UNFCCC reporting guidelines on NCs reported as such. However, the ERT found that brief information on "new and additional" financial resources was included in the documentation boxes to tables 6.1 and 6.2 of Japan's NC6. The ERT also found that financial contributions to the Global Environment Facility (GEF) were provided for only two years instead of three, as required in two separate tables of the NC6 (data for 2011 and 2012 were reported in tables 6.3 and 6.4, respectively). Therefore, to enhance the transparency of its reporting, the ERT recommends that in its next NC Japan: (a) follow the outline of the UNFCCC reporting guidelines on NCs and provide in the first section of the textual part of its next NC information on what "new and additional" financial resources it has provided and clarify how it has determined such resources as being "new and additional" and (b) provide information on its financial contributions to the GEF in accordance with the format of table 3 of the UNFCCC reporting guidelines on NCs. In addition, to enhance the completeness of its reporting, the ERT recommends that Japan report financial contributions to the GEF for the latest three years available in its next NC.

117. In the documentation boxes to tables 6.1 and 6.2 of its NC6, Japan has indicated that it considers climate finance as "new and additional" if it is newly committed or disbursed finance from the previous year and if it contributes to climate change measures in developing countries. Every year, Japan seeks new funding from the Diet (see para. 22 above), and as such, the reported "new and additional" climate finance is newly committed or disbursed during a given period such that previously committed or disbursed climate finance is not reported twice.

118. Japan has reported that it strives to meet the needs of developing countries with its fast-start finance contributions through its embassies and Japanese International Cooperation Agency (JICA) offices in developing countries. Japan reported that as of December 2012, 952 projects in 114 developing countries had been implemented. These projects were undertaken after close consultation with the governments of developing countries and international organizations in response to the needs of recipient countries, as well as taking into account local economic situations and the contents of the projects. While

the ERT welcomes this information, it found that it was not clear to what extent Japan has provided assistance to developing countries that are particularly vulnerable to the adverse effects of climate change for meeting the costs of adaptation to those adverse effects. The ERT therefore recommends that Japan provide this information in its next NCs.

119. The ERT noted that Japan provided financial assistance figures for the years 2011 and 2012, but not for the year 2010. Because tables 4 and 5 of the UNFCCC reporting guidelines on NCs indicate that data should be reported for three years of the reporting period for financial contributions to multilateral institutions and bilateral contributions, respectively, the ERT encourages Japan to report data for the three last available years of the reporting period in its next NC.

120. Financial support contributions for climate change activities provided by Japan are channelled through the different ministries with responsibilities in the area of climate change. Grants, loans and technical assistance are provided by: the Ministry of Foreign Affairs; Ministry of Agriculture, Forestry and Fisheries; Ministry of Economy, Trade and Industry; Ministry of the Environment; Ministry of Land, Infrastructure, Transport and Tourism; and JICA. Contributions to international development organizations and multilateral funds are administered by the implementing entities. For Japan, these are mainly the GEF, the Climate Investment Fund, the United Nations Development Programme, the United Nations Environment Programme, the World Food Programme or the International Tropical Timber Organization. Funds provided through other official channels are provided by other relevant ministries and implementing agencies. The Ministry of Foreign Affairs has overall responsibility for gathering and compiling information on all the channels distributing Japan's fast-start contributions.

121. In the NC6, Japan reported that its fast-start finance assistance to developing countries is provided as official development assistance (ODA) through bilateral contributions, principally in the form of concessional loans but also as grants and technical assistance, as well as through contributions to multilateral funds such as United Nations organizations and international development organizations. The ODA contributions are administered by the relevant ministries, JICA and other institutions. Other official flows provide co-financing (investments, export credits and loans to international organizations) by the Japan Bank of International Cooperation (JBIC) and private financing to supplement public financing.

122. From January 2010 to December 2012, of its total USD 15 billion fast-start finance pledged contribution, Japan deposited a total assistance of USD 13.5 billion of public finance to developing countries to address climate change, mainly countries in Asia, followed by countries in Africa, small island developing states (SIDS) and least developed countries (LDCs). Most of Japan's fast-start finance consists of concessional loans, grants and technical assistance from the Government, and is mainly directed towards mitigation, followed by adaptation.

123. The mitigation programme (USD 9.99 billion) focused on the promotion of renewable energy, particularly solar, wind and geothermal energy, as well as on increasing energy efficiency. Adaptation projects (USD 1.37 billion) focused on increasing resilience, water, agriculture and early-warning systems. Cross-cutting mitigation and adaptation projects (USD 2.10 billion) included a mixture of adaptation, mitigation, capacity-building and technology transfer. Japan also provided a significant amount of resources to the REDD-plus programme (USD 723 million) for developing countries to conduct surveys on forest resources and to develop plans to manage forests and facilitate forestation.

124. The UNFCCC established specialized channels for assisting LDCs such as the Least Developed Countries Fund. During the review, Japan provided information on funds directed to particularly vulnerable countries such as LDCs, SIDS and countries in Africa.

The funds were provided mostly through bilateral and multilateral (including the GEF) channels from fast-start finance and totalled about USD 2.10 billion. Japan indicated that most of these funds were programmed mainly for adaptation, but for some projects, they also related to mitigation and cross-cutting issues.

125. Japan reported information on the importance of the role of the private sector in Japan's contribution to meeting its commitments on financial assistance and on how it promotes the scaling up of private investment in mitigation and adaptation activities. Participation of the private sector is incentivized by the initial injection of public financial assistance. For example, the private sector in Japan participates through co-financing together with JBIC and by the provision of trade insurance by Nippon Export and Investment Insurance. As a result of these efforts, Japan estimates that its private sector contribution was over USD 3 billion as of the end of 2012 (this contribution is not counted as part of its fast-start contribution).

126. Japan has provided information on its contributions to the GEF in accordance with its commitments to the fifth replenishment period (GEF 5). Japan is the second largest contributor to GEF 5 and committed to providing USD 210.34 million over the period 2011–2012, of which USD 96.0 million was for climate-specific projects. The ERT acknowledged with appreciation that Japan is one of the largest contributors to climate finance using a wide variety of channels including the private sector. The ERT noted that these commitments were made and kept, even though Japan has faced severe difficulties since the 2011 GEJE. During the review, Japan indicated that the Government did not contribute public funding to the Adaptation Fund but that it rather contributed via the private sector based on the share of proceeds from the clean development mechanism.

127. Table 6 summarizes information on financial resources and technology transfer.

Table 6
Summary of information on financial resources and technology transfer for 2010–2012
(Millions of United States dollars)

Allocation channel of public financial support	*Years of disbursement*		
	2010	*2011*	*2012*
Official development assistance[a]	11 021.42	10 831.40	10 494.53
Contributions through multilateral channels, including:	NA	981.05	1033.33
Multilateral climate change funds		751.73	762.69
Global Environment Facility	NA	105.17	105.17
Multilateral financial institutions	NA	143.80	184.10
Contributions through United Nations bodies	NA	85.52	86.54
Contributions through bilateral and regional channels	NA	3 817.95	3 765.14
Fast-start finance		13 500.00[b]	

Abbreviation: NA = not available.

[a] Organisation for Economic Co-operation and Development. 2013. *Japan*. In: Development Co-operation Report 2013: Ending Poverty. Paris: Organisation for Economic Co-operation and Development. Available at <http://dx.doi.org/10.1787/dcr-2013-36-en>.

[b] The fast-start contribution is for the period between January 2010 and December 2012.

2. Technology transfer, including information under Article 10 of the Kyoto Protocol

128. Japan has provided in its NC6 information on activities related to the transfer of technology. A detailed review of reported information is provided in chapter II.D.3 of the report of the technical review of the first biennial report.

129. Although Japan has reported information on its technology transfer activities in table 6.7 of its NC6 and included factors that contributed to the success of the reported activities, it did not report on success and failure stories related to technology transfer as required by the UNFCCC reporting guidelines on NCs. During the review, Japan provided additional information elaborating on the difficulty of assessing and reporting on project failures. These challenges included access to data, as well as the fact that project completion normally falls outside the reporting period of the NC6. Japan has also indicated that it does have a system for monitoring, reporting and verifying processes as part of its reporting to its Ministry of Finance and other national agencies under some projects that could be used as a source of failure stories. The ERT recommends that Japan explore ways to identify success and failure stories and report on such stories explicitly in its next NC.

130. In addition, Japan has reported in the text and in table 6.7 of its NC6 that it undertakes many technology development and transfer activities, as well as activities to support institutional arrangements for enhancing adaptive abilities and know-how of developing countries. However, Japan did not report explicitly on activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies. During the review, Japan mentioned that the gathering and compiling of detailed information from the various agencies is a significant challenge. The ERT recommends that Japan address this reporting requirement specifically and provide some explicit examples of activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies in its next NC.

131. Japan has reported in textual format on the steps taken by its governments to promote, facilitate and finance the transfer of technology. In section 6.3 of its NC6, Japan reported on its projects implemented to enhance the capacity of developing countries to effectively conduct climate change policies. In table 6.8 of its NC6, Japan provided descriptions of many programmes or projects implemented to: enhance the capacity of policymakers and practitioners in the Asia Pacific region by sharing knowledge on climate change adaptation; develop the capacity of researchers and others for building low-carbon societies; enhance the capacity on flood control measures; build the capacity and strengthen institutional mechanisms to mitigate dangers of flood hazards in Caribbean States; enhance the disaster reduction capacity in the Philippines; enhance the capacity for groundwater development in Tanzania; and develop the capacity for studying measures in response to the variation of precipitation patterns, promoting integrated water resource management in Indonesia. However, the vast majority of the projects described aimed at transferring Japanese technologies as opposed to developing or enhancing developing countries' endogenous technologies. The ERT therefore recommends that Japan report on the steps taken to support the development and enhancement of endogenous technologies of developing countries.

132. Japan has provided in its NC6 information on its ACE initiative announced in November 2013 (see para. 26 above). The ACE initiative has three pillars, innovation application and partnership, to promote the development and diffusion of leading low-carbon technologies. Conditional on a return to budget surpluses[11] of national and local government finances by 2020, the Government of Japan, together with the private sector, will invest substantial amounts of money in technological innovation (combined amount of USD 110 billion over five years). The JCM, which facilitates the diffusion of low-carbon

[11] Before interest payment.

goods and services in developing countries, is worth mentioning. It also facilitates the implementation of mitigation actions in developing countries, and REDD-plus projects are being considered for implementation under the JCM.

E. Vulnerability assessment, climate change impacts and adaptation measures

133. In its NC6, Japan has provided the required information on the expected impacts of climate change in the country and on adaptation options.

134. Japan's NC6 includes a detailed description of the vulnerabilities to climate change. Several climate change impact analysis studies have been undertaken in Japan considering observations, complex global and regional models and socioeconomic data and using the Intergovernmental Panel on Climate Change (IPCC) *Special Report on Emissions Scenarios*. Impacts on water resources, mountain and coastal areas, natural ecosystems, agriculture and human health have been analysed.

135. The ERT noted that the information provided in the NC6 regarding adaptation measures is limited and even less detailed than that reported in the NC5. The NC6 includes information on adaptation to natural disasters related to vulnerability to floods and heavy rains in mountainous areas and to the vulnerability of the coast to the rise of sea level and high tides.

136. Table 7 summarizes the information on vulnerability and adaptation to climate change presented in the NC6 and during the review.

Table 7
Summary of information on vulnerability and adaptation to climate change

Vulnerable area	*Examples, comments, adaptation measures reported*
Agriculture and food security	*Vulnerability*: increasing rice yields but decreasing rice quality due to increasing temperatures and CO_2 concentrations, expansion of the area of some disease vectors, affecting crops
	Adaptation: implementation of pest control strategies
Biodiversity and natural ecosystems	*Vulnerability*: changes in distribution and population of certain wild mammals, bird species and some insects; coral bleaching and the expansion of zones unfit for coral skeleton formation; shifts in flowering
	Adaptation: measures are currently under development
Coastal zones	*Vulnerability*: increases in sea level; increases in intensity of typhoons
	Adaptation: disaster management prevention programmes, including monitoring and forecasting programmes, construction of sea walls and coastal planting programmes
	Adaptation: measures are currently under development
Water environment and water resources	*Vulnerability*: flooding due to rising levels of rivers; increases in the mass movements in mountain areas; potential increases in saltwater intrusion into the groundwater; increased risk of storm surges
	Adaptation: disaster management prevention programmes
Fisheries	*Vulnerability*: changes in the availability of different fish species with decreases in several species catches
	Adaptation: measures are currently under development
Human health	*Vulnerability*: expansion of tiger mosquito transmission area; increases in heat- or stress-related deaths
	Adaptation: public health prevention policies

Vulnerable area	*Examples comments adaptation measures reported*
Infrastructure and economy	*Vulnerability*: increases in abandoned farmland as a consequence of expansion of wild animal habitats *Idaptation*: measures are currently under development

137. During the review, and upon the request of the ERT, Japan provided additional information about programmes to mitigate the impacts of climate change related to the control of vectors, and also provided the ERT with the report *Approaches to Climate Change Adaptation* (Committee on Approaches to Climate Change Adaptation, 2010), referenced in the NC6, which includes options on adaptation measures on food, water environment and water resources, water-related disasters in coal areas, natural ecosystems, health and other sectors. Japan also informed the ERT that this set of options is being considered in the development of the national adaptation plans, which are currently under development and are expected to be finished by mid-2015. The ERT notes that the reporting would be significantly enhanced by including the additional information provided to the ERT during the review in the next NC.

138. Japan further provided information on actions for the assessment of impacts and adaptation policies undertaken at different levels of government in the dissemination of relevant climate information for early-warning purposes.

139. In its NC6 and during the review, Japan has provided information on the actions taken to implement Article 4.1(e) of the Convention on cooperation with Parties not included in Annex I to the Convention in preparing for adaptation, supporting initiatives focused on strengthening adaptive capacities in developing countries. Examples of this are the Global Adaptation Network and the Asia–Pacific Adaptation Network initiatives that cover support to countries in Asia, Latin America, the Caribbean, Africa and West Asia. Particularly relevant is the Sentinel Asia initiative, which is focused on the use of remote-sensing techniques to assist disaster management in the Asia–Pacific region.

F. Research and systematic observation

140. Japan has provided information on its actions relating to research and systematic observation, and addressed both domestic and international activities, including the World Climate Programme, the International Geosphere–Biosphere Programme, the International Human Dimensions Programme of Global Environmental Change, the Global Precipitation Measurement Programme, the Global Change Observation Mission, the IPCC, the Argo project, in cooperation with the World Meteorological Organization, the United Nations Educational, Scientific and Cultural Organization's Intergovernmental Oceanographic Commission, the International Research Network for Low Carbon Societies and the Low Carbon Asia Research Network that promotes research to support the development of policies for low-carbon growth by enabling dialogue between scientists and policymakers. The ERT commends Japan for its substantial efforts in setting a strong foundation in basic and applied research on climate change.

141. Japan provided comprehensive information on governmental policies related to research and systematic observation, including the adoption in 2011 of the fourth science and technology basic plan (2011–2015) that includes the promotion of the green innovation, focused on a lower-carbon energy strategy for energy supply and social infrastructure.

142. Japan is one of the countries that actively participate in climate modelling research studies and projections that serve as the basis for the IPCC assessments. As part of these

activities. in 2012, Japan launched a new five year research programme for risk information on climate change, which includes improvements for climate change risk projections.

143. In its NC6, Japan reports information on the main fields of research activities on climate change, which are: (a) research on climate processes and the climate system, including the paleoclimate; (b) climate change modelling and projection studies; (c) climate change impacts; (d) socioeconomic analysis; and (e) research and development on adaptive technologies. The ERT notes that the information included in the NC6 is limited compared with the amount of research activities that Japan is carrying out in climate change. During the review, Japan provided relevant information about other activities and existing programmes that were not included in the NC6, such as the development of new technologies in the field of renewable energies and the development of a comprehensive research programme (2010–2015) to provide scientific findings for policy decision makers of Japan and other countries, including the development of vulnerability and adaptation indexes. The ERT encourages Japan to provide more detailed information on its research activities in the next NC.

144. The NC6 does not include information about the actions taken on the international exchange of data. Nevertheless, during the review, Japan informed the ERT about the initiative named the data integration and analysis system, with the mission to produce scientifically and socially valuable information by integrating and analysing earth observation data, numerical model outputs and socioeconomic data in an effective manner, and which includes the dissemination of data and information as one of the specific goals. The ERT encourages Japan to include this information in its next NC submission.

145. Several actions have been taken by Japan to support capacity-building in developing countries and also to enhance their research activities. While most of the efforts are focused on the Asia–Pacific region, throughout the Sentinel Asia and Asia–Pacific Network for Global Change Research initiatives, there are some other activities organized by JICA, such as training workshops, dispatch of experts and joint research projects such as the Science and Technology Research Partnership for Sustainable Development promoted by JICA and the Japanese Science and Technology Agency, with institutions in developing countries.

146. Japan developed research activities under the research programme on climate change adaptation to provide scientific knowledge for planning climate change adaptation policies, particularly for local governments, in order to include the results of global projections in their local adaptation plans. Nevertheless, the ERT noted that Japan did not include information in the NC6 on how the results of these studies are being translated into actions to implement adaptation measures. During the review, and in response to a question raised by the ERT, Japan indicated that the research results are being used as a basis for the development of the national adaptation plan that is expected to be finished by mid-2015. The ERT notes that reporting on the way in which the research results are used for designing and planning adaptation measures would enhance the transparency of reporting in the next NC.

G. Education, training and public awareness

147. In the NC6, Japan has provided information on its actions related to education, training and public awareness at both the domestic and international level. Compared to the NC5, the Party provided more information about the changes in the curricula of the courses at all levels of education, and also about new public campaigns to promote the understanding of environmental implications of the energy policies, including nuclear energy and renewable energy sources.

148. The NC6 states that the Ministry of Education, Culture, Sports, Science and Technology upgraded the contents of environmental education at the levels of elementary

(in 2011), junior high schools (in 2012) and high schools (in 2013), focusing on closely related subjects such as social studies, science, and technical and homemaking courses. However, the NC6 did not report information on the contents of the upgrade to the environmental education. During the review, Japan provided detailed information on the contents of the corresponding curricula in relation to climate change, which allowed the ERT to understand to what extent the promotion of environmental education is considered in the country. The ERT encourages Japan to improve the transparency of its reporting by including, in its next NC, the main contents of the curricula on environmental issues at all levels of education.

149. Japan reported in its NC6 that public opinion on environmental awareness is considered by specific public campaigns and by financial support of NGOs. However, the ERT notes that the NC6 does not refer to how civil society views are considered in the definition of environmental policies, and encourages Japan to improve the transparency of its reporting by including this issue in its next NC.

III. Summary of reviewed supplementary information under the Kyoto Protocol

A. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

150. Supplementary information provided by Japan under Article 7, paragraph 2, of the Kyoto Protocol in its NC6 is complete and transparent. The supplementary information is located in different sections of the NC6. Table 8 provides an overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC6 chapters in which this information is provided.

151. The technical assessment of the information reported under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 8
Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

Supplementary information	*Reference to the sixth national communication*
National registry	Chapter 2, section 2.3
National system	Chapter 2, section 2.2
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Addendum to NC6
Policies and measures in accordance with Article 2	Chapter 3, section 3.1.3
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Addendum to NC6
Information under Article 10	Chapter 6, section 6.2
Financial resources	Chapter 6, section 6.1

B. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

152. Japan reported the information requested in section H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", of the annex to decision 15/CMP.1 as a part of its 2013 annual submission. During the review, Japan provided the ERT with the additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT considers the reported information to be complete and transparent.

153. The 2013 and previous national inventory reports and the additional information provided during the review presented several initiatives of Japan aimed at minimizing adverse impacts, including cooperating in the development of technologies, conducting relevant research, promoting a greener tax system, and providing subsidies and other financial support for renewable energy and energy conservation equipment.

IV. Conclusions and recommendations

154. The ERT conducted a technical review of the information reported in the NC6 of Japan according to the UNFCCC reporting guidelines on NCs. The ERT concludes that the NC6 provides a good overview of the national climate policy of Japan. The information provided in the NC6 includes all elements of the supplementary information under Article 7 of the Kyoto Protocol. During the review, Japan provided additional information on supplementarity and additional descriptions related to national legislative arrangements and administrative procedures that seek to ensure implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

155. Japan's emissions for 2012 were estimated to be 8.8 per cent above the 1990 level excluding LULUCF and 8.6 per cent above the 1990 level including LULUCF. Emission increases were driven by the substitution of nuclear energy by fossil fuel energy production linked to the impact of GEJE in 2011 and economic growth. These factors outweighed improvements in the efficiency of energy use (e.g. in the transport sector), as well as emission reductions in the industrial processes, agriculture and waste sectors.

156. Based on the comparison of the target (1,185,651.53 kt CO_2 eq) and the average annual emissions (1,278,482.34 kt CO_2 eq) for the first commitment period (2008–2012) of the Kyoto Protocol, Japan will be in a position to meet its target of a 6 per cent reduction below the base year level, owing to a significant contribution from the LULUCF sector and the use of units from the Kyoto Protocol mechanisms.

157. In 2007, the last year before the start of the first commitment period of the Kyoto Protocol, Japan's total GHG emissions amounted to 1,364,282.27 kt CO_2 eq, which represents an increase of 8.2 per cent above the base year level. In the NC6, Japan reported that its 2008–2012 average annual emission level after accounting for LULUCF and units from Kyoto Protocol mechanisms would be at 16.6 per cent below its 2007emissions level. Given that the use of units from the Kyoto Protocol mechanisms can contribute for a 5.9 per cent decrease from the base year level, which is about a third of the total 16.6 per cent decrease from the 2007 emission level, Japan considers that its use of units from the Kyoto Mechanisms is supplemental to its domestic action.

158. Japan reported GHG emission projections for a 'with measures' scenario for 2020 that is based on currently implemented PaMs, and therefore excludes nuclear energy from the energy mix. Total GHG emissions excluding LULUCF in the 'with measures' scenario

are projected in 2020 to be at a level that is 0.9 per cent above the 2005 base year level. Considering the reported information on the expected level of the contribution from forest management LULUCF removals in 2020 of 38,000 kt CO_2 eq, projected GHG emissions including these removals are expected to be 1.9 per cent below the 2005 base year level by 2020 (an increase of 10.5 per cent above the 1990 level), while the target is 3.8 per cent below the 2005 base year level. Japan plans to make up this difference with additional PaMs not yet included in the projections (e.g. renewable energy and refrigerant management policies), credits from its JCM and potentially units from market-based mechanisms under the Convention.

159. Japan's PaMs to limit GHG emissions currently operate under the Basic Environmental Law and other legislation, under which is enacted the Act on Promoting Global Warming Countermeasures. In May 2013, this act was amended to replace the Kyoto Protocol target achievement plan, which had been formulated to address the first commitment period of the Kyoto Protocol, with provision for a forward-looking plan for global warming prevention. The full details of this plan are still to be determined. Until then, Japan is operating under the principle of global warming policies for the time being.

160. GEJE had a major impact not only on Japan's GHG emissions owing to the substitution of nuclear power plants by fossil fuel power plants, but also on Japan's new emission target for 2020 of 3.8 per cent below the 2005 base year level. As key measures to meet that target, which will be revised taking into account the contribution of nuclear power, Japan identified: a 20 per cent improvement in energy intensity; improvement of the emission factor of electricity by introducing renewable energy; amendment of the law on fluorocarbons to deliver emission reductions; implementation of JCM, which enables Japanese and other developed country businesses to invest in offset projects in developing countries to facilitate the diffusion of leading low-carbon technologies resulting in credits for avoided GHG emissions and emission reductions (see para. 42); and the enhancement of the carbon sink of forests.

161. Under the ACE initiative, Japan is planning to contribute to an 80 per cent reduction of GHG emissions by developed countries and to a 50 per cent reduction of global GHG emissions by 2050 by innovation of low-carbon technologies, application of existing technologies (e.g. carbon dioxide capture and storage) and partnerships with various stakeholders. Japan is annually checking the progress of some 180 PaMs set forth in the Kyoto Protocol target achievement plan in the Global Warming Prevention Headquarters.

162. From January 2010 to December 2012, of its total USD 15.0 billion fast-start finance pledged contribution, Japan has deposited a total assistance of USD 13.5 billion of public finance to developing countries to address climate change, mainly countries in Asia, followed by countries in Africa, SIDS and LDCs. Most of Japan's fast-start finance consists of bilateral agreements on concessional loans, grants and technical assistance from the Government, and is mainly directed towards mitigation, followed by adaptation.

163. Japan is the second largest contributor to GEF 5 and is committed to providing USD 210.34 million over the period 2011–2012, of which USD 96.0 million was for climate-specific projects. Japan is one of the largest contributors to climate finance overall, uses a wide variety of channels and has mechanisms in place to ensure participation of the private sector. The ERT noted that Japan's commitments were kept, even though Japan has faced severe difficulties since the 2011 GEJE.

164. A combined approach, with global and regional complex models and the observations obtained by Japan in an extensive network, including ground- and air-borne-based measurements, satellite observations and oceanographic and marine measurements, has been used by Japan to assess the impact of climate change in agriculture and food security, biodiversity and natural ecosystems, coastal zones, water environment and water

resources, fisheries, human health, infrastructure and the economy. Japan has also developed some research projects focused on disaster management prevention programmes, public heath prevention policies and pest control strategies. Japan is currently developing national adaptation plans that are expected to be finished by mid-2015.

165. As one of the leading nations in basic and applied studies in climate change, Japan has developed a significant amount of activities and initiatives in research and systematic observation, and the results were an important contribution to the development of the IPCC Fifth Assessment Report. Japan has also developed an important amount of domestic and international actions to enhance environmental education and public awareness.

166. In the course of the review, the ERT formulated several recommendations relating to the completeness and transparency of Japan's reporting under the Convention and its Kyoto Protocol. The key recommendations[12] are that Japan:

(a) Improve completeness of reporting by including in the next NC the following information:

(i) A complete description of the government structure, including the Reconstruction Agency and the relocation of the Nuclear Regulation Authority (para. 13 above);

(ii) Results of key source identification and a description of the process for the recalculation of previously submitted inventory data (para. 19 above);

(iii) Details on how it believes its PaMs, for example, by sector or by gas, are modifying longer-term trends in GHG emissions and removals (para. 32 above);

(iv) GHG emission projections in an aggregated format for each sector using GWP values (para. 100 above);

(v) Projections of net emissions of CO_2, CH_4, and N_2O including LULUCF (para. 100 above);

(vi) GHG emission projections related to fuel sold to ships and aircraft engaged in international transport, reported separately from the total (para. 100 above);

(vii) Relevant information on factors and activities for each sector to provide an understanding of emission trends in the years 1990 to 2020 (para. 100 above);

(viii) Estimates of the total effect of PaMs in total and by gas (para. 112 above);

(ix) Financial contributions to the GEF for the latest three years available (para. 116 above);

(x) Success and failure stories, where feasible, related to technology transfer (para. 129 above);

(xi) Explicit references to activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies (para. 130 above);

(b) Improve the transparency of reporting by including in the next NC the following information:

(i) What "new and additional" financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention and clarify how it has determined such resources as being "new and additional" in the first section of the textual part of its next NC, following the outline of the UNFCCC reporting guidelines on NCs (para. 116 above);

[12] The recommendations are given in full in the relevant sections of this report.

(ii) Financial contributions to the GEF in accordance with the format of table 3 of the UNFCCC reporting guidelines on NCs (para. 116 above);

(iii) Details on to what extent Japan's assistance was provided to developing countries that are particularly vulnerable to the adverse effects of climate change for meeting the costs of adaptation to those adverse effects (para. 118 above);

(iv) Steps taken to support the development and enhancement of endogenous technologies of developing countries (para. 131 above).

V. Questions of implementation

167. During the review, the ERT assessed the NC6, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol and reviewed information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, with regard to timeliness, completeness, transparency and adherence to the reporting guidelines on NCs. No question of implementation was raised by the ERT during the review.

Annex

Documents and information used during the review

A. Reference documents

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

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B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Yu Kamei (Ministry of the Environment), including additional material on national circumstances, the national registry, recent climate policy developments in Japan, and greenhouse gas emission projections.